

**WHAT IS CLAIMED IS:**

1. A method for adjusting an optical system that has a multilayer mirror that includes a multilayer film,  
5 said method comprising the steps of:

measuring wave front aberration of the optical system;

10 determining a condition to remove part of the multilayer film in the multilayer mirror so that the wave front aberration measured in said measuring step may reduce; and

removing the part of the multilayer film in the multilayer mirror based on the condition determined by said determining step.

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2. A method according to claim 1, wherein the condition defines a removal area of the part of the multilayer film in the multilayer mirror.

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3. A method according to claim 1, wherein the condition defines a removal amount of the part of the multilayer film in the multilayer mirror.

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4. A method according to claim 1, further comprising the steps of:

calculating an adjustment amount of the multilayer mirror so that the wave front aberration measured in said measuring step may reduce;

adjusting the multilayer mirror based on the  
5 adjustment amount calculated by said calculating step;  
and

repeating said measuring step, said calculating step and said adjusting step so that the wave front aberration may reduce.

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5. A method according to claim 4, wherein the adjustment amount includes a position of the multilayer mirror.

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6. A method according to claim 4, wherein the adjustment amount includes an angle of the multilayer mirror.

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7. A method according to claim 1, further comprising the step of repeating said measuring step, said calculating step and said adjusting step so that the wave front aberration may reduce.

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8. A method according to claim 1, wherein the optical system includes plural multilayer mirrors.

9. A method according to claim 1, wherein said measuring step measures the wave front aberration using EUV light.

5 10. A method according to claim 1, wherein said measuring step measures the wave front aberration using ultraviolet light, visible light or infrared light.

10 11. A method according to claim 1, wherein said removing step removes the part of the multilayer film in the multilayer mirror using sputtering.

15 12. A method according to claim 1, wherein said removing step removes the part of the multilayer film in the multilayer mirror using ion beam milling.

20 13. An adjustment apparatus for adjusting an optical system that has a multilayer mirror that includes a multilayer film, said adjustment apparatus comprising:

a measurement part for measuring wave front aberration of the optical system;

a removal part for removing part of the multilayer film in the multilayer mirror; and

25 a controller for determining a condition to remove the part of the multilayer film in the multilayer mirror based on the wave front aberration

measured by the measurement part, and for controlling said removal part to remove the part of the multilayer film in the multilayer mirror in accordance with the condition that has been determined.

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14. An optical apparatus comprising an adjustment apparatus for adjusting an optical system that has a multilayer mirror that includes a multilayer film, wherein said adjustment apparatus includes:

10 a measurement part for measuring wave front aberration of the optical system;

a removal part for removing part of the multilayer film in the multilayer mirror; and

15 a controller for determining a condition to remove the part of the multilayer film in the multilayer mirror based on the wave front aberration measured by the measurement part, and for controlling said removal part to remove the part of the multilayer film in the multilayer mirror in accordance with the

20 condition that has been determined.

15. An optical system comprising a multilayer mirror that includes a multilayer film, said optical system being adjusted by an adjustment method that includes the steps of:

measuring wave front aberration of the optical system;

determining a condition to remove part of the multilayer film in the multilayer mirror so that the wave front aberration measured in said measuring step may reduce; and

5 removing the part of the multilayer film in the multilayer mirror based on the condition determined by said determining step.

16. An exposure apparatus comprising an optical system that includes a multilayer mirror that has a multilayer film, said exposure apparatus exposing an object via the optical system adjusted by an adjustment method that includes the steps of:

measuring wave front aberration of the  
15 optical system;

determining a condition to remove part of the multilayer film in the multilayer mirror so that the wave front aberration measured in said measuring step may reduce; and

20 removing the part of the multilayer film in the multilayer mirror based on the condition determined by said determining step.

17. A device fabrication method comprising the  
25 steps of:

exposing an object using an exposure apparatus; and

performing a development process for the object exposed,

wherein the exposure apparatus includes an optical system that includes a multilayer mirror that  
5 has a multilayer film, the optical system being adjusted by an adjustment method that includes the steps of:

measuring wave front aberration of the optical system;

10 determining a condition to remove part of the multilayer film in the multilayer mirror so that the wave front aberration measured in said measuring step may reduce; and

removing the part of the multilayer film in  
15 the multilayer mirror based on the condition determined by said determining step.